IN THE CLAIMS:

Claims 1-40 (canceled)

Claim 41 (currently amended): A signal coupling network for coupling any one of N1 inputs to any one of N2 outputs comprising:

a plurality of substantially identical, KxK signal interconnect modules ~~wherein~~ where each contains K^2 input lines, where K<N1, and couples them to K^2 output lines and ~~wherein a~~ where K^2 separate signal ~~path couples~~ paths in each module couple each input line to a respective output line of each module.

Claim 42. (currently amended) A network as in claim 41 ~~wherein~~ where the plurality comprises

$\left(\frac{N1}{K} \times \frac{N2}{K}\right)$ modules.

Claim 43. (original): A network as in claim 41 which includes N1 input switches.

Claim 44. (original): A network as in claim 43 which includes N2 output switches coupled to the plurality.

Claims 45-56. (canceled)

Claim 57. (currently amended): A network as in claim 41 ~~wherein~~ where N1 equals N2.

Claim 58. (currently amended): A network as in claim 41 where ~~wherein~~ each of the KxK signal interconnect modules comprises a plurality of substantially identical LxL interconnect modules where L<K, each LxL interconnect module carries L^2 separate, passive signal carriers which couple L^2 inputs to L^2 outputs with each output substantially identical to each respective input.

Claim 59. (currently amended): A network as in claim 58 where ~~wherein~~ the plurality of LxL interconnect modules comprises $\left(\frac{K}{L}\right)^2$ modules.

Claim 60. (previously presented): A network as in claim 58 which includes N1 input switches.

Claim 61. (previously presented): A network as in claim 60 which includes N2 output switches.

Claim 62. (currently amended): A network as in claim 58 ~~wherein~~ where connectivity between the inputs, the modules and the outputs is symmetrical relative to a selected centerline.

Claim 63. (currently amended): A signal coupling network for coupling anyone of N1 inputs to any one of N2 outputs comprising:

a plurality of substantially identical, KxK signal interconnect modules wherein each contains K^2 input lines, where K<N1, and couples them to K^2 output lines wherein a separate signal path couples each input line to a respective output line of each module;

~~wherein~~ where each KxK module includes:

a body portion which includes a plurality of LxL signal coupling networks with L<K;

K input ports coupled to the body portion;

K output ports coupled to the body portion; and

a plurality of signal paths, carried by the LxL signal coupling networks, the signal paths couple the input ports to the output ports.

Claim 64. (currently amended): A network as in claim 63 ~~wherein~~ where the plurality of signal paths comprises K^2 paths.

Claim 65. (currently amended): A network as in claim 63 ~~wherein~~ where the signal paths comprise one of optical fibers or electrical conductors.

Claim 66 (currently amended): A signal coupling network for coupling any one of N1 inputs to any one of N2 outputs comprising:

a plurality of substantially identical, KxK signal interconnect modules ~~wherein~~ where each contains K^2 input lines, where K<N1, and couples them to K^2 output lines;

~~wherein~~ where N1 inputs comprise $\frac{N1}{K}$ groups of signal carriers coupled to a corresponding number of KxK modules; and

where the plurality comprises $\left(\frac{N1}{K}\times\frac{N2}{K}\right)$ modules.

Claims 67-75. (canceled)

76. (new): A signal coupling network to interconnect N inputs to any one of N outputs comprising a plurality of KxK interconnect modules, K<N, each module having K^2 inputs coupled

to K^2 outputs with each input coupled to only one output by a separate optical transmitting fiber with each fiber extending only between one input and one output pair.

77. (new): A network as in claim 76 with the plurality having $\left(\frac{N}{K}\right)^2$ members.

78. (new): A network as in claim 76 where each KxK interconnect module comprises a second plurality of substantially identical LxL interconnect modules, L<K, the second plurality comprises $\left(\frac{K}{L}\right)^2$ members.

79. (new): A network as in claim 76 with the N inputs divided into $\frac{N}{K}$ groups of inputs with K inputs per group coupled to a corresponding number of 1xN switches with N switch outputs divided into $\frac{N}{K}$ groups of K outputs, the $\frac{N}{K}$ groups of K outputs per switch are coupled in turn to inputs of $\frac{N}{K}$ members of the plurality of interconnect modules.

Claim 80. (new): A network as in claim 79 with N outputs divided into $\frac{N}{K}$ groups of outputs with K outputs per group, with K outputs per group coupled to $\frac{N}{K}$, Nx1 switches with N switch inputs divided into $\frac{N}{K}$ groups of K switch inputs, the $\frac{N}{K}$ groups of K inputs per switch are coupled in turn to $\frac{N}{K}$ outputs of $\frac{N}{K}$ members of the plurality of interconnect modules.

R E M A R K S

Entry of this Amendment and examination of the above-identified application are hereby requested. In the prior, Final Office Action, the Examiner imposed a restriction requirement relative to four groups of claims. Applicant hereby elects Group I, namely, claims 41-44 and 57-66. Consistent with this election, claims 67-75 have been cancelled. This election is hereby made with traverse.

Also, in the previously filed Amendment A, claim 66 was re-written in independent form in response to the Examiner's prior indication that claim 66 was objected to but contained allowable subject matter. In the Final Office Action, claim 66 in independent form was rejected in view of Suemura et al. A review of the amended claim 66 indicated that one of the limitation had not been replicated in claim 66 when it was rewritten in independent form. Claim 66 has now been amended a second time including the missing limitation from claim 42. It is believed that claim 66 is now allowable for the same reasons that the Examiner objected to claim 66 in the initial Office Action. Several new claims, also allowable, have been added.

Interconnect networks which embody the present invention are particularly advantageous in that they can be manufactured to any desired size, that is to say any desired number of inputs and outputs in a very standardized and systematic fashion which overcomes serious problems recognized in the prior art. Referring to the prior art Fig. 1 of the present application, as the number of inputs and outputs associated with telecommunications switching equipment increase, the interconnecting fabric increases on the order of N^2 for N inputs and N outputs. This poses substantial manufacturing problems for large N. The problems do not end after the interconnect network has been manufactured. Failures in the field may well require entirely replacing a very large interconnect fabric not withstanding the fact that only one connection may have failed. To say the least, this is a very undesirable situation.

The inventors have recognized the important advantages and benefits associated with modular interconnect fabrics. Fabrics which embody the present invention can be implemented from a plurality of substantially identical KxK modules. The modules can be interconnected to form substantially larger interconnect networks which can be used to switch any one of N inputs

to any one of N outputs where N is greater is K. In these embodiments, a total of $\left(\frac{N}{K}\right)^2$, KxK modules is required.

Unlike the prior technology where different values of N required completely different interconnect networks, interconnect networks for different values of N can be created simply by varying the number of basic KxK modules as N increases. Hence, manufacturing, support and maintenance systems can be created which focus on the manufacturing and reliability of standardized KxK modules. This is not only be very cost effective but it can produce high reliability.

It should also be noted that embodiments of the invention can also incorporate multi-level modular systems in a given interconnect. A KxK interconnect module can in turn be created from a plurality of LxL interconnect modules where L is less than K.

An exemplary interconnect module which embodies the present invention is illustrated in Fig. 2A of the present application. Such modules incorporate K^2 electrical or optical signal paths so as to interconnect K^2 inputs to K^2 outputs. In such modules, there is no signal processing. The signal lines whether they be electrical lines or optical fibers are passive. There are no processing components in such modules. An input signal is transmitted through the respective signal carrier of a module to the respective output substantially unchanged.

The pending claims bring out the various aspects of the claimed invention. As explained in more detail subsequently, all of the pending claims are allowable.

It is also submitted that the claims are patentable over Suemura et al. Suemura et al has completely failed to address modular interconnects as claimed. The interconnects of Suemura et al suffer from the same prior art problems discussed above. Further, as described below, Suemura engages in optical signal processing in various structures relied on by the Examiner in previously rejecting the pending claims.

For example, claim 41 requires that:

> "K^2 separate signal paths in each module couple each input line to a respective output line of each module."

In the Final Office Action, the Examiner appears to be proposing a modification of Suemura's module 123 in view of a portion of Fig. 11 thereof. However, the Examiner has failed to point to any suggestion, motivation or teaching as to why one of ordinary skill in the art would modify Suemura et al as suggested so as to make the pending claims obvious.

It is not enough when attempting to establish a prima facie case of obviousness to simply point to disparate structures in a disclosure or a prior art document as a rationale for a conclusion of obviousness. As required by the MPEP, page 2100-124, 125 (8th Edition, Rev. No. 1):

> "First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings ... Finally, the prior art reference ... must teach or suggest all of the claim limitations.
>
> The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be found in the prior art, not in the applicant's disclosure."

In that Final Office Action, the Examiner switched from a discussion of the structure of module 123 of Fig. 8, page 4 of the Office Action, to a reference to Fig. 11 "item 135 input/output represent a separate signal path that couples each input line to a respective output line of each module", top of page 5 of the Office Action. The required suggestion or teaching to modify Suemura et al in accordance with claim 41 has not been articulated. In fact, one of skill in the art would not make the modification proposed by the Examiner.

The structure of module 123 of Suemura et al is a splitter-multiplexer as illustrated in Fig. 9 of Suemura et al. This structure in fact combines signals in various ways and clearly does not meet the above quoted limitation from claim 41. The structures 135 noted by the Examiner of Fig. 11 are each, according to Suemura et al, a 4-input and 1-output space division optical switch. These are designated by the reference numerals 135(0), 135(4), 135(8), 135(12), and so forth." (Col. 13, lines 25-29, Suemura et al).

Thus, the structure noted by the Examiner "item 135" is in fact a 4-1 multiplexer. One of four inputs can be selected and coupled to a single output. Such structures are clearly quite different from and have a different structure than the above-quoted limitation from claim 41.

It is submitted that the structure of module 123 noted by the Examiner at the bottom of page 4 of the Office Action and item 135 noted at the top of page 5 of the Office Action represent a teaching away from the above quoted limitation. In addition to the missing motivation, suggestion or teaching, these structures would lead one away from and not toward the claimed structure.

It is also submitted that the Examiner's "design choice" rationale referred to on page 5 of the Office Action, merely addresses a change in a size of the structure of Fig. 11, of Suemura, which is a completely different structure than claimed. Once again no suggestion, motivation or teaching is identified as to why a structure such as module 123 would be modified in accordance with the structure of Fig. 11 by one of skill in the art so as to make the pending claims obvious. There is no articulated suggestion, teaching or motivation.

The only motivation noted by the Examiner had to do with modifying the size of various aspects of Fig. 11 and did not take into account or consider the previously noted structure in the rejection, namely, module 123. As noted above, module 123 has a fundamentally different structure than claimed and in fact teaches away from the claimed structure.

For at least the above reasons, it is believed that the pending claims are allowable over Suemura et al.

Allowance of the application is respectfully requested.

Respectfully submitted,

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